

Claims

1. A capacitor comprising a hollow capacitor element formed by rolling a pair of flat sheet-like electrodes, with separators interposed therebetween, a bottom-closed metallic casing receiving the capacitor element and a drive electrolyte therein, and an opening-sealing plate sealing an opening portion of the metallic casing, the opening-sealing plate having an external connection terminal, wherein a rubber-like elastic member is provided on a surface of said opening-sealing plate at a peripheral edge portion thereof, and an electrically-insulating layer formed on said metallic casing to cover at least a region extending from the open end of said metallic casing to a recess provided for fixing said opening-sealing plate, and said rubber-like elastic member is pressed by the open end portion of said metallic casing.

2. The capacitor according to claim 1, in which the capacitor element has lead-out leads connected respectively to the pair of electrodes, and an end surface of one of the electrodes projects in a direction opposite to a direction of projecting of said lead-out leads.

3. The capacitor according to claim 1, in which end surfaces of the pair of electrodes of the capacitor element are projected in opposite directions, respectively, and lead-out leads are connected respectively to flat surface portions of the end surfaces of the electrodes.

4. The capacitor according to claim 3, in which an electrically-insulating

plate is provided between the two lead-out leads.

5. The capacitor according to claim 1, in which the electrically-insulating layer is made of a polyaminoamide compound or a modified olefin resin.

6. The capacitor according to claim 1, in which the pair of flat sheet-like electrodes have polarizable electrode layers formed respectively on surfaces of current collectors each composed of a metallic foil or an electrically-conductive polymer, said polarizable electrode layer being composed of a mixture comprising at least activated carbon, a binding agent and an electrically-conducting agent.

7. The capacitor according to claim 1, in which a metallic foil, having a metal oxide film formed on a surface thereof, is used in at least one of the pair of flat sheet-like electrodes.

8. The capacitor according to claim 1, in which projections for positioning and/or fixing a center portion of the capacitor element are formed on an inner bottom surface of the metallic casing and the opening-sealing plate, respectively.

9. The capacitor according to claim 1, in which a hollow core member is provided at a center portion of the capacitor element.

10. The capacitor according to any one of claims 1 to 3, in which a tapering

thickened wall portion is provided in contacting relation to an inner bottom surface and an inner side surface of the metallic casing.

11. The capacitor according to claim 1, in which electrode end surfaces of said capacitor element project in opposite directions, respectively, and one of the electrode end surfaces of the capacitor element is electrically connected to an inner bottom surface of said metallic casing, and there is provided a current-collecting plate having an external connection terminal electrically connected to the other electrode end surface of said capacitor element, and said external connection terminal of said current-collecting plate extends through said opening-sealing plate.

12. The capacitor according to claim 11, in which an external connection terminal is provided at an outer bottom surface of the metallic casing.

13. The capacitor according to claim 11 or claim 12, in which the current-collecting plate, having the external connection terminal, is an opening-sealing current-collecting plate which is made of metal, and serves also as the opening-sealing plate.

14. The capacitor according to any one of claims 11 to 13, in which an annular convex portion is formed on a peripheral edge portion of a surface of the opening-sealing plate or the opening-sealing current-collecting plate disposed in contact with the rubber-like elastic member.

15. The capacitor according to claim 11 or claim 12, in which a sealing member is provided in a through hole portion of the opening-sealing plate disposed in contact with the external connection terminal of the current-collecting plate.

16. The capacitor according to claim 15, in which an electrically-insulating layer is formed on that surface of the external connection terminal of the current-collecting plate held in contact with the through hole portion of the opening-sealing plate.

17. The capacitor according to claim 13, in which an annular convex portion is formed on an outer peripheral portion of that side of the opening-sealing current-collecting plate to be joined to the capacitor element, and an electrically-insulating layer is provided on the outer peripheral portion including said annular convex portion.

18. The capacitor according to any one of claims 11 to 13, in which a projection for positioning and/or fixing a center portion of the capacitor element is formed on at least one of an inner bottom surface of the metallic casing, the current-collecting plate and the opening-sealing current-collecting plate.

19. The capacitor according to any one of claims 11, 16 and 17, in which the electrically-insulating layer is made of a polyaminoamide compound or a modified olefin resin.

20. The capacitor according to any one of claims 11 to 13, in which the pair of flat sheet-like electrodes have polarizable electrode layers formed respectively on surfaces of current collectors except electrode end surface portions, said current collector being composed of a metallic foil or an electrically-conductive polymer, and said polarizable electrode layer being composed of a mixture comprising at least activated carbon, a binding agent and an electrically-conducting agent.

21. The capacitor according to any one of claims 11 to 13, in which a metallic foil, having a metal oxide film formed on a surface thereof, is used in at least one of the pair of flat sheet-like electrodes.

22. The capacitor according to any one of claims 11 to 13, in which a hollow core member is provided at a center portion of the capacitor element.

23. The capacitor according to any one of claims 11 to 13, in which a tapering thickened wall portion is provided in contacting relation to the inner bottom surface and inner side surface of the metallic casing.

24. The connecting method of connecting a plurality of capacitors as defined in claim 11, in which the capacitors are connected together at outer bottom surfaces or outer side surfaces of their respective metallic casings by brazing and/or welding.

25. The capacitor connecting method according to claim 24, in which the

connection is effected, using a connecting member.

26. The capacitor according to claim 1 or claim 11, in which the electrically-insulating layer is made of acryl-melamine resin.

27. The capacitor according to any one of claims 1, 5, 11, 16, 17, 19 and 26, in which as a pretreatment for providing the electrically-insulating layer on the metallic casing, at least one of a degreasing treatment, a surface-roughening treatment and an oxide film-forming treatment is applied to said metallic casing.

28. The capacitor according to claim 1 or claim 11, in which said electrically-insulating layer is an anodized aluminum layer.

29. The capacitor according to claim 1 or claim 11, in which the open end portion of the metallic casing is formed into a curved shape.